

Yosio KOBAYASI*: **Mycological survey of Mexican
volcano Popocatepetl (2)****

小林義雄*: ポポカテペトル山菌類調査 (2)**

Almost all of the higher fungi here treated were identified by Dr. G. Guzman, who published the provisional list of 105 species found in this area.

1) Higher fungi found at the market of the village Amecameca at the foot of Mt. Popocatepetl The writer took a walk with Guzman around the market and found the followings at several corners.

Amanita rubescens (Gantake), *A. vaginata* (Tsurutake), *A. flavipes* Imai (Kogane-tengutake), *Clavaria* sp., *Clitocybe gibba* (Kayatake), *Helvella crispa* (Noboriryô), *H. lacunosa* (Kuro-amigasatake), *Laccaria laccata* (Kitsunetake), *Lactarius deliciosus* (Akamomitake), *Lactarius indigo* (Schw.) Fr. "Azula", with deep blue-coloured gills, *Ramaria flava* (Kihôkitake), *Lycoperdon umbrinum* (Tsubuhokoritake), *Suillus granulatus* (Chichiawatake), *Tricholoma* sp.

It is very interesting that *Helvella crispa*, *H. lacunosa* and *Amanita flavipes* are virtually eaten by the Mexican natives.

2) Higher fungi collected in *Abies religiosa* forest We stopped several minutes at a point (3150 m in alt.) and found the following mushrooms.

Clavariadelphus truncatus (Surikogitake), *Clavulina cinerea*, *Lactarius scrobiculatus* (Kikarahatsutake), *Morchella conica* (Togariamigasatake).

3) Higher fungi collected at Paro de Cortes This pass (3500 m in alt.) is situated between Mt. Popocatepetl and Ixtaccihuatl and *Pinus hartwegii* forest is dominating with the undergrowth of *Festuca tolucensis*.

Amanita flavipes, *A. solitaria* (Matsukasa-modokitake), *Boletus pinicola* parasited by *Sepedonium chrysogenum*, *Cantharellus cibarius* "menebrillo" (Anzutake), *Clitocybe gibba* (= *C. infundibuliformis*) (Kayatake), *Cystoderma amianthinum* (Shiwakarakasatake), *C. fastibile*, *Lactarius chrysorheus* (Kichichitakemodoki), *L. deliciosus* (Akamomitake), *L. rufus* (Akachichitake),

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** Continued from Journ. Jap. Bot. 53(4): 122-128 (1978).

Lyophyllum decastes (Fr.) Sing. "Jolete" edible. *Macropodia macropus* (Hatsunohatake), *Naematoloma capnoides* (Fr.) Karst.

Almost all of these species are common to Japan.

4) **Fungi found in *Pinus hartwegii* forest between Paro de Cortes and Tramacas** Tramacas station (3870 m in alt.) is the upper limit of *Pinus* forest.

Boletus pinicola.

Clitocybe sp., odor unpleasant. Gills decurrent, whitish. Pileus dry.

Dacrymyces punctiformis Neuh. in Schw. Z.f. Sitzk. 12: 81 (1934); Martin, Rev. North Central Tremellales p. 30 (1952). Fructifications gregarious, frequently confluent, pulvinate, small, 2-4 mm in diameter, pale yellow, drying orange-coloured. Spores subcylindric, curved, $15-22 \times 5-6.5 \mu$, 1-3 septate.

Hab. On dead twig of *Pinus hartwegii*.

Dictyopanus pusillus (Lév.) Singer in Lloydia 8: 224 (1945); Corner, in Trans. Brit. Myc. Soc. 37 (3): 258 f.3 (1954).

Spores ovoid, hyaline, $3-3.5 \times 2-2.5 \mu$. Cheilocystidia numerous, clavate or cylindric, spiculose with dense processes. Pileocystidia clavate, with sparing

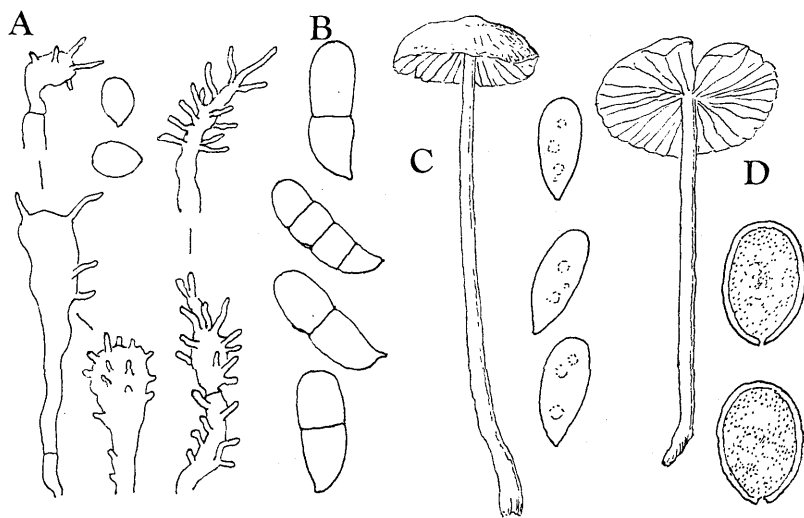


Fig. 1. Higher fungi. A. *Dictyopanus pusillus*. Pileocystidia (left), cheilocystidia (right) & spores (upper middle). B. *Dacrymyces punctiformis*. Spores. C. *Omphalina* sp. Fructification & spores. D. *Galerina* sp. Fructification & spores.

processes.

Hab. Gregarious on dead trunk of unknown tree.

Hygrocybe coccinea (Beniyamatake), *Hygrophorus chrysodon* Commonly found, *H. olivaceo-albus*, *Inocybe fastigiata* (Ookinuhada-toyamatake), *I. godeyi*, *Laccaria amethystina* (Uramurasaki), *L. laccata* (Kitsunetake), *Lactarius rufus* (Akachichitake), *Lycoperdon perlatum* (Hokoritake), *Lycoperdon* aff. *umbrinum* (Tsubuhokoritake), *Marasmius alliaceus* (= *M. prasiosmus*) (Shirokarehatake), *Morchella esculenta* (Amigasatake), *Mycena epipterygia* (Nameashitake), *Mycena pura* (Sakuratake), *Mycena* sp. Pileus brown to yellowish, smooth, context whitish. Gills white. Stem whitish, smooth. *Naematoloma sublateralitum* (Kuritake), *Psathyrella spadicea*, *Psathyrella* sp., *Rhodophyllus* sp., *Russula brevipes* (Aibashirohatsutake), *R. emetica* (Dokubenitake), *R. olivacea* (Kusairo-akanetake), *R. queletii*, *Stropharia* sp., *Suillus granulatus* (Chichiawatake), *Tremella mesenterica*, *Tricholoma terreum* (Kumashimeji).

5) **Fungi found in the shrub and herb zones** These zones are extending between the upper limit of coniferous forest (3800 m in alt.) and ever snow line (4200 m in alt.). As the volcanic feature, the gravelly and dry sandy slopes are developing with scanty grasses and shrubs. Only two species of Agaricales were found.

Omphalina sp. Pileus umbonate with curved margin, 5 mm in diameter, surface velvety, striate, orange-red. Gills remote. Stalk 17×0.6-1 mm, orange-yellow. Spore 5-5.5×2-2.5 μ , ellipsoid, hyaline, smooth.

Hab. Solitary among mosses in grassy slope.

Galerina sp. Pileus 8 mm in diameter. Stalk 20×0.6-1 mm, striate, fibrillose, hollow, without ring. Gills adnate, broad, dark brown. Spores ovoid, 6.5-7×4.5-5.5 μ , smooth, dark brown.

Hab. Solitary among mosses in grassy slope (3900 m in alt.). The members of Hyphomycetes and pycnidial stage of Coelomycetes were found on the dead stems and leaves of *Juniperus*, *Lupinus* and *Cirsium*. *Drechslera* stage of dematiaceous Hyphomycetes was collected on the leaves of *Festuca*.

6) **Water moulds** Dr. Kazuko Konno separated and identified the following seven water moulds (excl. *Pythium* sp.) from the following soil samples, which were collected along the unique small stream at the roadside (3150 m in alt.) in *Abies* forest, and at the other spots.

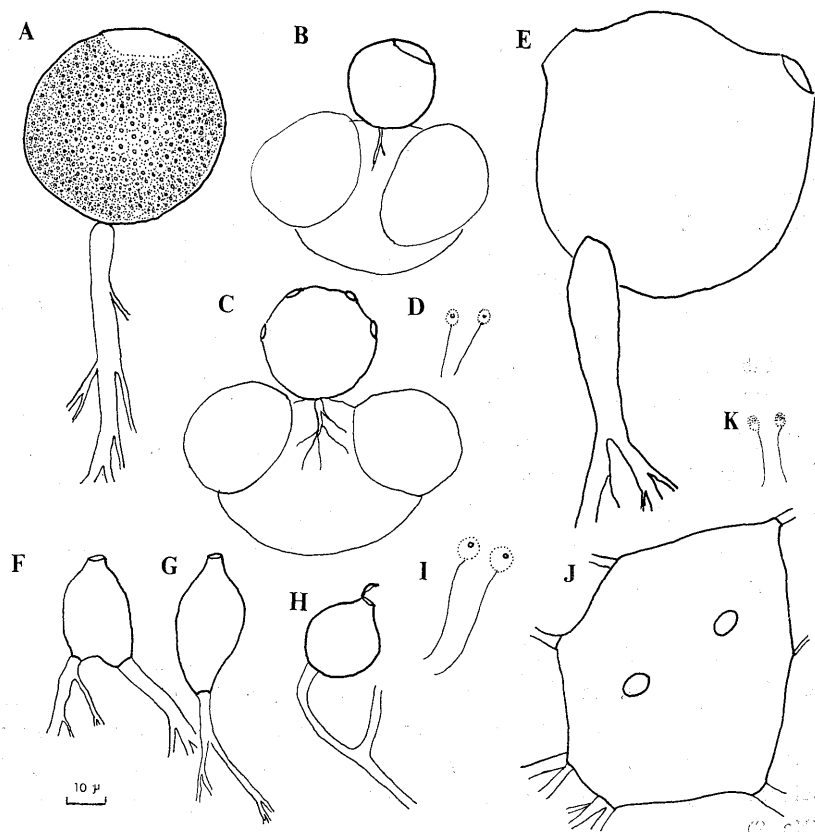


Fig. 2. Water moulds. A. *Rhizophydium chitinophilum*. B. *Rhizophydium pollinis-pini*. C, D. *Rhizophydium sphaerotheca*. Empty zoosporangia & zoospores. E. *Rhizophydium* sp. F, G. *Rhizophlyctis oceanis*. H, I. *Nowakowskiella profusa*. J, K. *Catenophlyctis variabilis*.

No. 1. Litter with soil under the stock of *Ribes* sp. (3850 m)

No. 2, 3. Sand in small side ditch along the road near Tlamacas (3800 m)

No. 4, 5. Sandy soil in stream in *Abies* forest (3150 m)

Rhizophydium chitinophilum Antikajian in *Mycologia* 39: 613, f. 1-20 (1947).

Zoosporangia spherical or subspherical, 26-95 μ in diameter; wall colorless, smooth, with one or two broad, low, dome-shaped exit papillae, 7-25 μ in diameter at the base, up to 9 μ in height. Rhizoidal system arising from single point of the zoosporangium, branching and extending luxuriantly, some-

times with stalk-like appearance at the base, $4-7\mu$ in diameter at the base, up to 300μ or more in length. Zoospores spherical to subspherical $4-5\mu$ in diameter, with a single flagellum $17-25\mu$ in length.

Hab. Saprophytic on cicada wings from soils No. 3 and 5.

Rhizophydium pollinis-pini (Braun) Zopf pro parte, in Abhandl. Naturf. Ges. Halle 17: 82, Pl. 1, f. 16-20 (1887); Sparrow, Aquatic Phycomycetes 2nd ed., p. 268, f. 17J (1960).

Hab. Saprophytic on pine pollen from soil No. 4.

Rhizophydium sphaerotheca Zopf in Abhandl. Naturf. Ges. Halle 17: 92, Pl. 2, f. 33-41 (1887).

Hab. Saprophytic on pine pollen from soils No. 3 and 5.

Rhizophydium sp. Zoosporangia spherical or subspherical, $18-100\mu$ in diameter; wall smooth, colorless, with one or two broad exit papillae, $8-15\mu$ in diameter. Rhizoidal system arising from a single point of zoosporangium, stipitate, $4-12\mu$ in diameter, $8-50\mu$ in length, then branching and extending profusely. Zoospores spherical to subspherical, $3-4\mu$ in diameter, flagellum $20-25\mu$ in length.

Hab. Saprophytic on snake skin from soil. No. 3.

This fungus closely resembles *R. chitinophilum* morphologically, but differs in substratum. In the original description, *R. chitinophilum* is restricted on chitinous substratum, while present fungus grows on snake skin as keratinous substratum. It is necessary to precise cultural experiment on their substrata, because these two fungi are collected from the same soil material (No. 3).

The present fungus resembles also *R. stipitatum* in its substratum, zoosporangial size and stipitated feature of rhizoidal system, but differs in number of exit papillae.

Rhizophlyctis oceanis Karling in Amer. Jour. Bot. 56: 211-221, f. 108 (1969)

Zoosporangia ovate, obovate or ellipsoidal, $18-25\mu$ in diameter, $25-38\mu$ in length; wall smooth, colorless, with a short exit tube apically, $3-5\mu$ in diameter, $2-6\mu$ in length. Rhizoidal system arising from one to three or more points of zoosporangium, branching and extending. Zoospores not observed.

Hab. Saprophytic on cicada wings from soil No. 3.

Nowakowskiella profusa Karling in Bull. Torrey Bot. Club 68: 386 (1941)

et 71: 382, f. 45-68 (1944).

Zoosporangia globose or subglobose, 18-20 μ in diameter, non apophysate; wall smooth, thin, with one operculate exit papilla apically, operculum 4 μ in diameter. Rhizomycelia profusely developed and branching, 2-5 μ in diameter, without intercalary swellings. Zoospores spherical, 5-7 μ in diameter, flagellum 30 μ in length.

Hab. Saprophytic on pine pollen from soil No. 3.

Zoosporangial formation was very scanty, in contrast to the profuse development of rhizomycelia.

Catenophlyctis variabilis (Karling) Karling in Amer. Jour. Bot. 52: 134, f. 1-12 (1965).

Zoosporangia intramatrical, globose, subglobose, ellipsoid or irregularly angulate, 25-60 μ in diameter, 40-82 μ in length; wall smooth, colorless or pale yellowish, with one to two exit tubes, 5-8 μ in diameter. Rhizoidal system arising from several points of the zoosporangium, branching and extend-

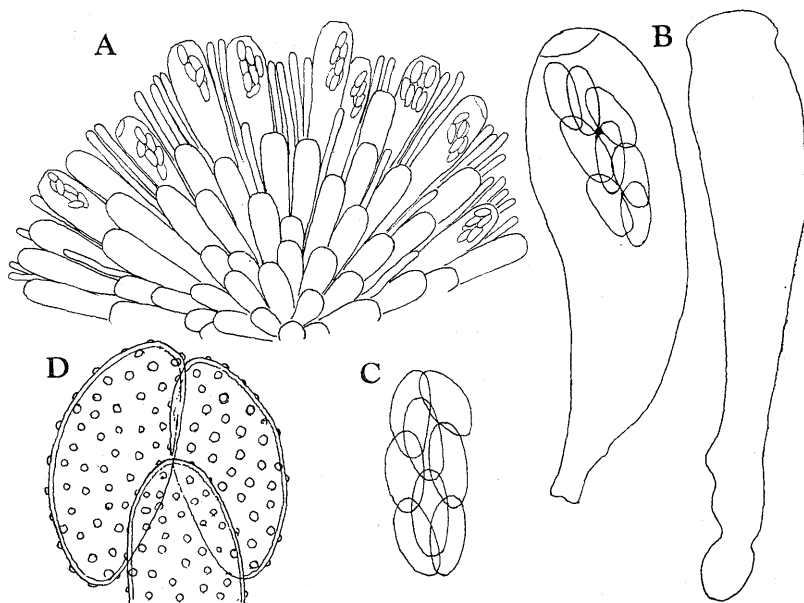


Fig. 3. *Saccobolus thaxteri*. A. Surface view of apothecia. B. Asci. C. Spore cluster. D. Ascospores.

ing luxuriantly, $2-6\mu$ in diameter at the base. Zoospores subspherical, $2-3\mu$ in diameter, $3-4\mu$ in length, flagellum $15-18\mu$ in length.

Hab. Saprophytic on snake skin from soil No. 2.

Pythium sp. Isolated from No. 4. Sexual organ none. Sporangia $22-40\mu$ in diam. with 8-13 spores $7.5-11\mu$ in diam. Stalk of sporangia 5μ thick. Hyphae $10-12\mu$ thick.

7) **Coprophilous fungi** In the shrub and herb zone were picked up the droppings of hare and cow bred in Tlamacas farm.

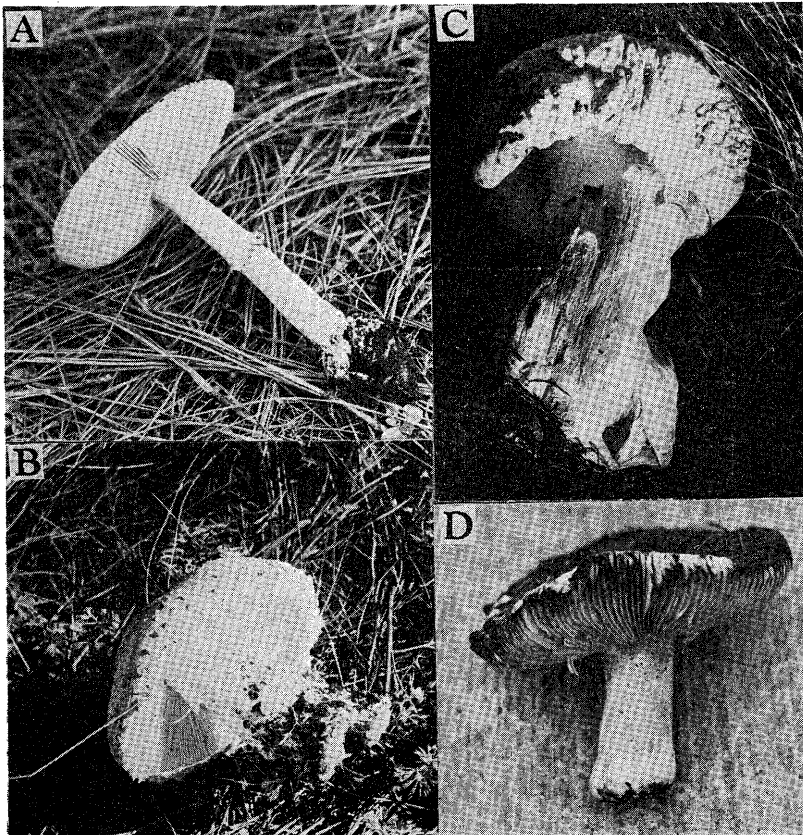


Fig. 4. A. *Amanita flavipes*. B. *Amanita solitaria*. C. *Boletus pinicola*, parasited by *Setonium chrysospermum*. D. *Russula olivacea*.

No. 6 (4000 m in alt.), hare dropping. No. 7, 8 (3800 m), hare dropping.
No. 9, 10 (3800 m), cow dropping.

From these samples, one species of Discomycetes and seven species of Pyrenomycetes were separated.

Saccobolus thaxteri Brummelen in Persoonia, suppl. 1: 197 f. 69, pl. 15 f. D, E (1967).



Fig. 5. A. Left, *Inocybe confusa*. Right, *Hygrocybe chrysodon*. B. *Dacrymyces punctiformis*.

Apothecia superficial, low obconical, small, 0.25–0.4 mm in diameter, whitish pale rosy in young stage, then tinted in violet. Asci short clavate, with truncate apex, $110\text{--}130 \times 22\text{--}35\mu$. Ascospores 8, compactly united in a package, ejected together, $16\text{--}18 \times 7\text{--}10\mu$, ellipsoid-fusiform, asymmetrical, dark purple-coloured, thick-walled, with granular surface. Paraphyses cylindrical, hyaline.

Hab. Gregarious on hare dropping (no. 6, 7, 8)

Distr. Thailand, Philippines, U. S. A.

Literature

Guzman G. (1972) Algunos macromicetos, Liqueenes y mixomicetos importantes en la zona del volcan Popocatepetl, in Guías Bot. Excursiones en Mexico p. 17–42. f. 7–34.

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この第 2 報では山麓の市場で売っていた食用きのこを含め、雪線 (4200 m) 附近までの山地で発見した高等菌類、および土壌などより分離した特殊菌類を挙げた。糞生菌の大部分は第 3 報で発表する。

□ W. Frey, H. Hurka & F. Oberwinkler (ed.): **Beiträge zur Biologie der niederen Pflanzen**. 233 pp. Gustav Fischer Verlag, 1977. 本書は Karl Mägdefrau (古植物学, 蘚苔類学, その他の広い分野で有名) の 70 歳の記念論文集で, コケ類, 地衣類, 菌類, 古植物関係の 10 篇の論文が集められている。W. Jung の “Die ersten Landpflanzen”, H. Hurka の “Isoenzyme und Systematik”, F. Oberwinkler の “Das neue System der Basidiomyceten” など注目を引くものが多い。R. M. Schuster は “The evolution and early diversification of the Hepaticae and Anthocerotae” を寄稿して, セン類, タイ類, ツノゴケ類は起源を全く異にし, phyllocladum を異にするという見解を出している。W. Frey はセン類の通導組織や葉の発生の研究からセン類の系統を論じ, セン類を含めたコケ植物とシダ植物が *Protophytaceae* (これは *Rhynia* などを含む) なる共通祖先型から分化したとする立場を論じている。全般として, 取扱っている内容は系統論を主目的としたものが多いが, 読みごたえのある論文ばかりである。内容的にもオリジナルなものが多く, コケ植物以下の陰花植物関係の系統論には重要な文献になるであろう。日本円で約 8000 円。 (井上 浩)